

**STUDY ON PSYCHOSOCIAL STRESSORS  
AND PSYCHIATRIC MORBIDITY IN  
ACUTE MYOCARDIAL INFARCTION**

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## **CERTIFICATE**

This is to certify that the dissertation entitled a “**STUDY OF PSYCHOSOCIAL STRESSORS AND PSYCHIATRIC MORBIDITY IN ACUTE MYOCARDIAL INFARCTION**” is a bonafide record of work done by **Dr.MOHAMED ILYAS RAHAMATHULLA.M** in the Department of Psychiatry, Government Rajaji Hospital, Madurai Medical College, Madurai, under the direct guidance of me.

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## **ABBREVIATIONS**

I.C.D.	-	International Classification of Diseases
D.S.M.	-	Diagnostic and Statistical Manual
C.H.D.	-	Coronary Heart Disease
T.A. B.P.	-	Type A Behaviour Pattern
W.C.G.S.	-	Western Collaborative Group Study
M.I.	-	Myocardial Infarction
D.M.	-	Diabetes Mellitus
B.P.	-	Blood Pressure
H.A.D.S	-	Hospital Anxiety and Depression Scale

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# INTRODUCTION

Mind and body relationship have concerned scientific minds from the beginning. Representatives from both psychiatry and medicine have agreed for more than hundred years that in some disorders, emotional and somatic activities overlap. These disorders were first called psychosomatic illness by Johann Christian Heinroth. This term was later popularized by Maxmilan Jacobi, German Psychiatrist.

In addition to general life stressors various investigators have suggested that specific personalities and conflicts are associated with different psychosomatic diseases. They were first identified in regard to the coronary personality, who tend to develop coronary heart disease. The classical risk factors do not give total explanation for the occurrence of coronary heart disease and that additional factors are involved in its genesis (WERKO, 1976)

There is a strong evidence to suggest that an interplay of personality characteristic with the environmental milieu plays a role in an individuals predisposition to coronary heart disease and large body of research has already been undertaken in this area (ROSEMAN and FRIED MAN, 1960)

And it has been suggested by some that type A behavior Pattern may be a middle class westerners way of reacting. Reactions to a stressful environment in Indians may take a form other than type A behavior.

Hence stressful life events more than personality characteristics might be causal to the genesis of ischemic heart disease. Heart has been hailed as contributing to vitality and the very life of the individual and any disorder is perceived as at worst fatal (or) at best disabling. For a lay person, a man felled by a heart attack can never be the same again. Fear about the consequences of infarction are always followed by psychological consequences such as anxiety and depression etc. The Liaison Psychiatry approach was tailored to the requirements of the local (or) indigenous socio-cultural background should be engaged in the psychiatric research for minimizing this psychological morbidity.

### **Scope of the study**

Though myocardial infarction is known to be due to psychosocial stressors, the detailed verification of the cause is not done in our setting. The nature of the stressors as perceived by local population has contested in the present study. Study also aims to corroborate on the prevalence of psychological morbidity following myocardial infarction and to know if they are correlated to the previous life events. The analysis of results should pave



the way for conceptualizing the psychotherapeutic issues of the Liaison Psychiatry in the indigenous situation.

### **Plan of the Study**

The present study has been planned as follows

Review of Literature

Methodology

Results and Interpretations

Discussion

Conclusion

## **REVIEW OF LITERATURE**

The world literature suggests that a causal relationship between emotional stress and physical illness has long been acknowledged. The Bible records the case of Nabal describing the psychosomatic background for his death from myocardial infarction. The very concept of mind body relationship went through many phases reflecting the psychosomatic concepts of that time period. Primitive society, Assyrian civilization, Greek civilization and others have conceptualized in different ways and scientists of different era such as Hippocrates, Plato, Galen and others have contributed to the evolution of thinking. Modern era has developed ideas about psychosomatic approach from the works of Freud, Jelliffe, Ference, Cannon, Alexander, Dunbar, Mead, Halliday, Mahl, Garma, Ruesch, Engel, Lipowski, Adler and Seeligman. (Alan Stoudemire)

Real Beginnings of psychosomatic medicine occurred around 1930 from the work of Flanders Dunbar who stressed that psyche and soma were two aspects of a fundamental unity. Theoretical emphasis has ranged from psychoanalysis theory to behavioral theories to neuro physiological explanations.

The concept of psychosomatic medicine was included in the first edition of the Diagnosis and statistical manual of mental Disorders (D.S.M-I.) as psychosomatic disorders and in DSM-II as “Psychological autonomic and visceral disorders’ In DSM-III, categories were deleted and replaced by the designation as psychological factors affecting physical conditions”. In DSM III-R it was called “Psychological factors affecting physical condition. In DSM-IV (1994) the term psychosomatic has been replaced with the diagnostic category of “Psychosomatic factors affecting medical condition”.

Among the various hypothesis specificity was proposed earliest. This explains why certain people developed psychosomatic disorders and why they developed a particular disorder. Specific unconscious conflicts are associated with specific psychosomatic disorders (for example, unconscious dependence conflict predisposes one to peptic ulcer) was hypothesized by Franz Alexander. Massive clinical data have adduced personality typologies, purportedly specific to several disease categories.

Concept of “Specific dynamic constellations” referred to patterned complexes of unconscious impulses and defenses. Events precipitating a disease onset bore a specific dynamic relationship to the vulnerability characteristic of the constellation. Emphasis was laid that stress could only be understood in terms of its particular meaning to the individual. Other

approaches to the specificity are fight flight responses, role of given up-giving up feelings, chronic non specific stress etc, but as a common reaction preceding illness, they have been less satisfactory.

The mediator between cognitively based stress and disease may be hormonal, as in the General Adaptation syndrome of Hans Selye, in which hydrocortisone is the mediator. This mediator may be changed the functions of the hypothalamo pituitary adrenal axis, with autonomic effects, adrenal enlargement and lymphoid shrinkage. The hormones are released from the hypothalamus and travel to the anterior pituitary, where trophic hormones interact directly or release hormones from endocrine glands. Autonomic nervous system plays the mechanism linking chronic stress and psychosomatic disorders. Monocytes, Neuropeptides, adrenergic catecholamines, Limbic system (Papez circuit) plays a role in psychosomatic disorders. Alexithymic persons are unable to read their own emotions, they have impoverished fantasy lives and are not conscious of their emotional conflicts; psychosomatic disorders may serve as an outlet for their accumulated tensions.

To the contemporary of psychosomaticist every disease in every person is psychosomatic. However certain disorders mentioned, frequently involving systems like cardio-vascular system, Respiratory system, Gastrointestinal system, Endocrinological system, Musculoskeletal system and skin disorder.

Psychosomatic disorders of cardiovascular system includes coronary artery disease, essential hypertension, congestive heart failure, vasomotor syncope, cardiac arrhythmias, Raynauds phenomenon, Mitral valve prolapse and psychogenic non cardiac chest pain. Cardiovascular disease have been aptly called 20<sup>th</sup> century disease. Among the cardiovascular disease ischaemic heart disease (myocardial infarction) is responsible for one third of all deaths, in men between the ages of 45 to 64 in the industrialized nations (WHO 1969). In India especially in the urban population the prevalence rate of Coronary Heart Disease approach that found in the west. Chadha and Radhakrishna (1990) carried out an epidemiological study on an urban population rate of 96.7 per 1000.

The prevalence of Coronary Heart Disease in rural population in India is low (Jajoo et al 1988), in urban populations it is closely similar to that is found in the western world. Coronary Heart Disease begins with the symptomless development and progression of atherosclerosis followed by clinical manifestations such as angina, myocardial infarction and sudden death.

Numerous biological, environmental, behavioral and sociocultural variables interact in its etiology and pathogenesis (Kannel 1979). Coronary Heart Disease can be seen as a disorder of life style and many of its etiologic

agents are potentially modifiable. As a result cardiovascular disorders have become one of the most researched topics and new area for research in psychosocial, and behavioral cultural factors (WHO 1992).

Epidemiologic research has identified a set of standard (or) physical risk factors for Coronary Heart Disease and many of these have implicated elements of life style and habits of living (eg. High blood pressure, smoking, High serum cholesterol, excessive intake of dietary food.) These risk factors differ in extent and consistency with which they have been associated with Coronary Heart Disease. The most widely accepted risk factors are smoking, serum cholesterol and high blood pressure (Kannel 1979).

Biobehavioral research on the development of coronary heart disease has received impetus from the inability of clinicians and epidemiologists to identify as many as 50% of the new cases of Coronary Heart Disease based on standard biological risk factors (Jenkins 1983, Krante Buam, and Singer 1983). A broadened search for mechanisms and influences contributing to Coronary Heart Disease had led to the examination of biological risk factors, social variable, psychological factors (eg. Type A behavior) and environmental characteristics (eg. Life stressors).

Among the risk factors AGE is a significant one. The risk of Coronary Heart Disease goes up sharply with increasing in age. In western countries the mean age is higher 59.7 yrs. To males and 58.4 for females.

Men have higher rate of Coronary Heart Disease incidence than the women. The male excess is probably due to Type A behavior, work overload and cigarette smoking (WALDRON, 1976).

**Higher socioeconomic status** correlates with coronary heart disease. But in later Studies non significance of socioeconomic status is understood and this would be related to cigarette smoking, obesity and elevated blood pressure have all become more common among the less affluent.

**Hypertensives** are 2 to 4 times susceptible for future Coronary Heart Disease. Blood pressure regulation is a complex phenomenon and genetic, environmental factors (stress, socioeconomic status), alcohol can contribute abnormally high levels (Stamler 1980, Sehmieder, 1986).

**Cholesterol** has been identified as a major risk factor for Coronary Heart Disease. There is a positive correlation of plasma cholesterol to atherosclerosis and its complications, mainly Coronary Heart Disease. Environmental factor play a role (Kannel et al, 1984, Nestruck, 1986).

**Epidemiological** studies have provided strong evidence and about relationship between smoking and Coronary Heart Disease. A dose response gradient between number of cigarettes smoked daily and Coronary Heart Disease incidence rates has been documented (Kannel, 1983). The relationship appears stronger for men (Nancy, A, 1996).

**Obesity** is a major risk factor for total mortality as well as for Coronary Heart Disease. It influences blood pressures, cholesterol etc. (GAZIANO, 1996).

**Alcohol** consumption appears ‘U’ shaped relationship with Coronary Heart Disease. Coronary Heart Disease among alcoholics and problem drinkers ranging from 20 to 60%. Studies on light and moderate drinkers have tended to show a modest reduction in coronary heart disease risk (Henk – EN’s 1983, Gazino, 1996).

The type A or coronary prone behavior pattern was first fully described and measured by Friedman and Rosenman (1959). It is perhaps the most intensively studied psychosocial risk indicator (Mathews, 1982).

Type A is neither a personality trait nor a set of external events but rather is the behavior that emerges when a characterologically predisposed person is challenged or blocked by an environmental circumstance.



**The type A style behaviour is characterized by some or all of the following traits:**

Competitiveness, intense striving for achievement, easily provoked hostility, a sense of urgency, quick actions, punctuality, impatience, abrupt and rapid speech, emphatic gestures and concentration on self selected goals to the exclusion of other aspects of the environment. It is also common for a type A person to be overcommitted to vocational or professional achievement at the expense of other facets of life. Persons who have the opposite style of behavior, who are relaxed, unhurried, less easily provoked, who speak with smoother modulation and who are more open to the broad richness of life experience, are defined as Type B (Friedman 1969, Jenkins 1979).

Type A behavior Pattern (TABP) is clearly not the same as stress or distress because it is neither an unpleasant stimulus nor a reaction of discomfort. Rather it is a pattern of intense and sustained behavioral activation that is usually self initiated.

The most commonly used measures of the Type A pattern are the structured Interview, (Rosenman, 1959); The Jenkins activity survey (JAS), the Framingham Type A scale and Bortner Rating Scale. Each seem to capture a large portion of the basic underlying dimension and significant association

exists between each of the instruments and Coronary Heart Disease independently (or) collectively.

Results of studies with Type A behavior strongly and consistently showed a positive association between the Type A Behavior Pattern and the prevalence and incidence of Coronary Heart Disease. Since about 1980, however, the results of prospective studies and the angiographic comparisons have swung in the negative direction, and the majority of studies have shown no significant association between Type A Behavior Pattern and Coronary Heart Disease.

Evidence supportive of Type A Behaviour Pattern as a Coronary Heart Disease risk factor has resulted from two major prospective studies of initially healthy individuals. The western collaborative Group study (WCGS) began in 1960 and examined approximately 3200 initially healthy men for 8.5 years.

The final report showed that those men assessed as type A by a structured Interview were more than twice as likely to develop clinical Coronary Heart Disease, than those assessed as type B (Roseman et al 1975).

In the Framinghams heart study, a psychosocial questionnaire was administered, from which the Framingham type A scale was derived. High

scores on this became an independent predictor of Coronary Heart Disease after 8 years (Haynes et al 1980).

The Belgian – French heart study of initially healthy men which used a self rating scale designed by Bortner to measure type A, again found that the incidence of Coronary Heart Disease associated with Type A Behavioral pattern (Belgiana – French Pooling Project, 1984).

Type A assessed by Bortner questionnaire has been found to be associated with coronary Heart Disease in a study among men in the U.K. (Heller 1979).

Two large scale studies with strong methodology which have provided the most compelling negative evidence for this association have been the multiple risk factor intervention trial (MRFIT), a clinical trial designed to alter cardiovascular risk factors in high risk men. Participants were given both the structured interview and the Jenkins Activity Survey (JAS) questionnaire to assess Type A Behavioral Pattern. Final results revealed no relation between Type A Behavioural Pattern and any clinical manifestation of Coronary heart disease (Shekelle et al 1985). The other was the Aspirin myocardial infarction study (AMIS - Shekelle et al 1985) which again showed no association between Type A Behavioral Pattern and Coronary Heart Disease.

Some other studies also given negative evidence (Dimsdale et al, 1978, Krantz et al 1981, Hall Strom et al 1986, Mann and Brennan 1987).

So it would be easy to conclude Type A is dead. This would be premature however because positive findings are still being reported. For example between 1980 to 1990, six studies have shown a positive relationship between Type A score and Coronary Heart Disease (Weiss and Richter, 1985, Kornitzer et al (1983), Bernards et al (1985), Sperafka et al (1990), Eaker et al (1989) and Togawa et al (1990).

The relationship of Type A Behavioral Pattern to Coronary Heart Disease is far from being a one to one relationship. Type A behavioral Pattern has positive association with non coronary forms of arterial disease example carotid arteriosclerosis (Stevens et al 1984), Peripheral arterial disease (Cottier et al 1983), and vascular migraine (woods et al 1984). Also found that Type A Behavior Pattern subjects are at greater risk for accidents and suicide.

Rime et al's (1989) data support the view that type A behavior pattern is a general disease prone conditions rather than a specific coronary risk factors.

The relationship of Type A Behavior Pattern to personality characteristics measured by standard psychological terms is controversial.

Jenkins (1971) suggested that these test were unlikely to be useful measure of Type A Behavior Pattern. But employ the Eysenck personality questionnaire (EPQ), the neuroticism scale was found to correlate positively with Type A Behavior Pattern by Irvine et al (1982) Smith (1984), Cramer (1991), Zoberl (1988) and Hecker et al (1988) though earlier work by Chersney et al (1981) found no relationship.

Emara et al (1986) studies Type A behavior in 60 male Arab patients with Coronary Heart Disease and compared to a similar number of patients with non cardiovascular diseases. The results did not support any association of Type A Behavior Pattern with Coronary Heart Disease in the patients studied. The association more reported in many western societies, the question is raised as to whether type A Behavior Pattern could be a culture bound cluster of behavioral characteristics.

In India, Bhatia et al (1990) studied 50 patients with Coronary Heart Disease and 50 normal controls, found Type A Behavioral Pattern in 72% of patients as compared to only 16% in the control group.

Is there a causal link.

Let us consider the following two simplified models.

- 1) The first and simplest model assumes that Type A Behavior Pattern leads to (or) causes coronary disease, presumably through stress related autonomic neuro endocrine mechanism.
- 2) The second model would postulate that both the Type A Behavior Pattern and that coronary heart disease are parallel (basically independent) manifestations of a central aggressive constitutional trait expresses itself in the psycho physiologic realm as type A and in the somatic realm as progressive coronary atherosclerosis.

**MODEL – I**

**Psychophysiological Patterns**

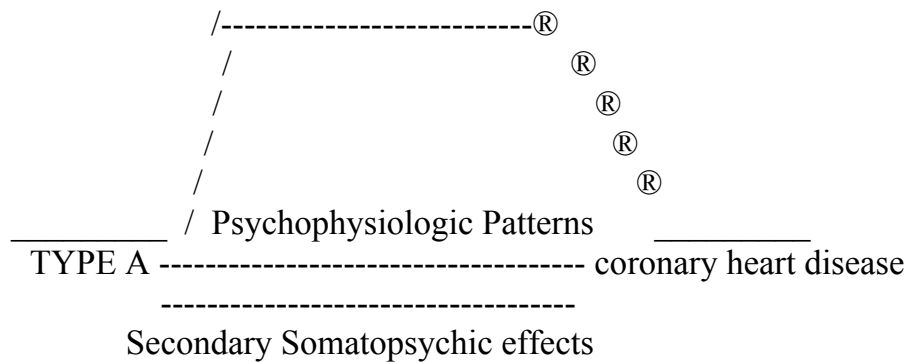
Type A ----- Coronary heart disease

= -----

Secondary somatopsychic effects.

**MODEL – II**

**Constitutional Trait**



## **Type A Behaviour pattern, depression and major life events**

Depression could interact with Type A behavior in many ways. Depression might alter proneness of illness more in Type A than in Type B subjects. Finally major life event might affect one type more than the other (Glass – 1977).

- 1) Type A Behavior Pattern could be associated with affective states, such as depression, anxiety or various other indices of distress. Various studies, using a variety of measures seem to agree that Type A Behavior Pattern is not correlated with such indicators of distress (Jenkins 1978, Caffey 1969).
- 2) “Depression can apparently suppress manifestations of Type A characteristics”.

It is well established that depression is a risk factor for a variety of illnesses and the question rises whether Type A subjects when depressed, might not be as greater risk for Coronary Heart Disease. Prospective studies are awaited.

## **Environmental Stress**

The term stress is derived from a 19<sup>th</sup> century concept in physics of outside force pressure (or) strong efforts.

Stress has been defined as the nonspecific response of the body to any demand. The adjustive demands placed on an organism and to the organisms internal biological and physiological responses to such demands. The adjustive demands, as the stressors and the effects they create with in the organism as stress.

**Hans Selye Classified the stress into two types.**

**Eustress** (Positive stress) – Healing pleasant

**Distress** (Negative stress) - Unpleasant and producing disease.

To explain the body's reaction to stress, selye formulated the General adaptation syndrome (GAS). The Body gives through 3 stages in demanding situations.

- First stage of alarm reaction
- Second stage of resistance, the body adopts to the stress.
- Third stage of exhaustion, where, because of the body's finite ability to cope, it becomes exhausted and death follows if the stress continues.

Stress may stem form frustrations, conflicts and pressures. The implicit of a stressor depends on its importance, cumulative effect, multiplicity and, imminence, stressors such as death of the loved one, divorce, job loss, serious illness tends to be high stressful to most people. Stressors often appear to have a cumulative effect (Singer, 1980).



A large volume of evidence has accumulated that event or situations in the environment which are perceived to have distressing or threatening quality may possibly through mechanisms involving sympathetic activation of the cardiovascular system leads to experience of Coronary Heart Disease.

Pathophysiologic model of the action of acute stress as a trigger of myocardial infarction and sudden death in vulnerable individual is illustrated in this figure.

Crude support of this view has come from studies suggesting that an increased risk of coronary Heart Disease from exposure to single major and usually traumatic event. Studies involving survivors of natural disaster such as flood and earthquake suggested that an increased risk of coronary heart disease follows such dramatic event even more closely in time (Abrahams et al, 1976). Extensive follow ups of survivors of prison of war camps indicate that such experience may endow a substantial delayed risk of coronary heart disease (Gilla, 1983).

A set of studies has explored the effect of Iraq missile attacks on Israel during the initial days of the 1991 Gulf war on fatal and non fatal cardiac events among the population living close to Tel Aviv. Cases of the acute MI treated in the intensive care unit of the Tel Aviv medical center were elevated during the week following the missile attacks, compared with weeks prior to the attacks and with the index period consisting on the same week a year earlier.

Los Angeles earth quake Report (1994), incidence of acute myocardial infarction admissions are more following the earth quake, when compared with the week before the disaster particularly for the patients within 15 miles of the earthquake epicenter.

**Methods have evolved to measure the environmental stressors were:**

- Social Readjustment Rating schedule (SRRS) (Holmes and Rahe's)
- Presumptive stressful life events scale (Gurmeet Singh)
- Scaling of Life Events Distress Scale (Paykell).

Theorell et al (1972), Rahe et al (1973), Johns (1973), Rehe et al(1994) Lundberg et al (1975). Life changes proceedings the onset of illness have been reported in the literature in the cases of psychosomatic diseases including many aspects of life events in relation to myocardial infarction which was positively correlated with stressful life events.

A recent study conducted by Hadziomerovic et al, for evaluating the acute myocardial infarction in condition of stress, caused by war (during 1991-1995) in correlation with post war period (1996-2000), reveals that, during the war period total of 992 patients (706 males and 286 females) developed acute myocardial infarction, and during the post war period, 583 patients (395 males and 188 females), developed acute myocardial infarction. Similarly, 183 patients (18.44%) (116 male and 67 female) showed mortality during war period, and 152 patients (26%) (87 males and 65 females) showed mortality during the post war period. He also says that, the increased mortality during post war period is possibly due to increased sympathetic tone, act as persistent stress.

Alexopoulos et al (1997) postulated that, the depression may be the result of cerebral arterial atherosclerosis. White et al (2001), suggested that dysregulation of the serotonin transporter, immune activation or reduced dietary intake of omega-3-fatty acids may be the cause for depression following the infarction.

Mahendru et al (1976) conducted a study on patients admitted in medical wards, Lucknow, for coronary heart disease. The study included seventy six patients of varying degrees of myocardial Ischemia. In 61.8% presence of emotional stress of sufficient intensity prior to the onset of coronary heart disease was demonstrated. The most frequent area of disturbance was maladjustment in the family (36.9%) severe financial stress (21.0%), Job difficulties (19.7%), Heavy loss in business (19.7%), Heavy debts (15.7%) Martial disharmony (9.2%), Death of wife (9.2%) Law suits and court appearances (7.9%), Death of children (7.9%) Recent death of parents (7.9%) Any chronic (or) disabling illness in the patient (6.6%), Death of any other close family member (5.3%) and any chronic or disability illness in close family member (3.9%).

One half of the patients reacted to heart attacks with depression, while 31.6% cases showed anxiety following attacks and the rest denied the existence of psychological repercussions.

Rama Reddy (1987) conducted a study on stressful life events preceding the onset of myocardial infarction and the psychological reaction occurring in the hospital following myocardial infarction. Patients experience more stressful events prior to onset of myocardial infarction. Emotional disturbances like anxiety and depression were found following infarction. Recovery depends on the social adjustment. Those who experienced more stressful events before the onset of myocardial infarction and showed more anxiety and depression.

Bhatia et al, (1990) studied the relationship between type A behavior stressful life events and its sequelae. Patients experienced higher number of stressful events in the year before the attack. Type A and Type B patients developed myocardial infarction. Both faces higher life events and there was no significant different in life changes during the past one year between Type A and Type B individuals.

The Mean anxiety and depression score in patients was high and also showed statistically significant improvement with passage of time.

Rajeev et al, (1993) studied the role of mental stress in coronary heart disease patients and confirmed a causal relationship between mental stress and ischemia in 68% of patients.

Theorell and Rahe (1970), Rahe and Passikivi (1970) Rahe and Lind (1971), Rahe (1973) conducted studies on psychosocial factors and myocardial infarction, a significant increase in life change units 6 months prior to myocardial infarction found.

Andrews (1981) conducted study of life events and psychological symptoms found that the occurrence of the major life events would increase the risk of illness between 2 and 7 times depending on the severity of the events and type of illness. There is an increase in risk for anxiety and depression.

In the study of Krantz, Kop, Santing (1996) it was found that acute stress triggers myocardial infarction and sudden death in vulnerable individuals through its action on central and autonomic nervous system.

Shapiro, (1996) studied psychiatric aspects of cardiovascular disease. The focus in psychological factors play in the development and progression of cardiac disease and psychiatric problems that arises in patients with cardiac illness was studied. The psychological factors are Type A behavior pattern and stressful life circumstances. Depression is a common problem following myocardial infarction. The major depression is 20% in the post myocardial infarction period.

Paykel (1974), Brown et al (1977) studied the relationship between life events and depression. Reported that neurotic depression is more common than psychotic or endogenous depression.

Jenkins (1976) reported anxiety, depression have been frequently associated with Coronary Heart Disease.

Zunza et al, (1984) conducted a study about the reactions to the life threatening events. Anxiety, depression and somatic complaints are more following myocardial infarction.

Barguero et al (1985) reported 45% of the patient population with myocardial infarction had psychological reactions like anxiety and depression.

Forrester et al (1992) reported major depressive syndromes were present in 19% of patients following acute myocardial infarction.

Ladwing et al (1994) conducted a study on male survivors of myocardial infarction. In 552 male survivors of myocardial infarction (age 53) were grouped at study entry according to their depression status. 377 patients were reassessed after 6 months. 13.3% had severe depression, 22.5% had moderate depression and 64.2% had low degree of depression. The point

prevalence of patients who have a major depressive disorder in the post infarction period in 15 to 20%.

Several well conducted studies reported no relationship between environmental stress and myocardial infarction. Conceptualized as life change and risk of coronary heart disease [Theorell et al, (1972), Camer (1979)]. This may be due in part to the inappropriateness of life changes as a dimension of judging the impact of life event.

Lundberg et al, (1975) were unable to distinguish between patients with coronary heart disease and controls on the basis of a life change index, but the use of an index based on the event to which subjects personally rated items in a life event inventory.

Lazarus can be argued that life events are not inherently stressful but become also only when interpreted as such with in a personal cognitive frame work. Only when patients with coronary heart disease were allowed to judge for themselves the degree of impact occasioned by the personal experience of life events were they distinct form controls. Patients with coronary heart disease did not tend to experience more life events than others but did seen to interpret those life events which occurred as carrying greater personal significance.



Ibrahim et al (1974) reported the reduction of coronary heart disease by 65% in one year follow up. Following group psycho therapy subsequent study by Rahe et al (1979), Ruber man et al (1984) confirmed these effects.

Bairay – Merz and Sabramian (1999) has found the 50% of reduction cardiac events in the intervention group in their study.

## **AIM OF THE STUDY**

Assessment of stressful life events, ischemic heart disease and psychiatric morbidity and their correlation.

### **OBJECTIVE**

1. To assess the frequency of stressful life events in myocardial infarction patient.
2. To compare the occurrence of stressful life events among myocardial infarction patients and randomly selected non-myocardial infarction patients with diabetes mellitus.
3. To assess the level of psychiatric morbidity in the post myocardial infarction period.
4. To assess the association of physiological changes such as hypertension with stressful life events.
5. To assess and compare the anxiety and depression in myocardial infarction patient and randomly selected non myocardial infarction, diabetes mellitus patient.

## **METHODOLOGY**

The detailed review of the concepts about the relationship between stressful life events, Ischaemic, heart disease (Myocardial Infarction) and post infarction psychological consequences reveal certain areas of agreement and certain areas of disagreement. The over all perception denotes that there is a questionable association between environmental stress factors and incidence of infarction. The present study is based on a hypothesis testing design with use of validated structured tools and definite statistical design. The limitation was in the randomness of sample design because of the obvious clinical and personal limitations.

The study was conducted in the intermediate care unit, Department of Cardiology, Government Rajaji Hospital, Madurai after obtaining the ethical committee approval. Thirty consecutive patients admitted after January 2006 who satisfied the following criteria were included in the study.

### **Inclusion Criteria**

1. Patients should have been admitted as a inpatient in the intensive care unit with the clinical and electro cardiogram (ECG) confirmation of myocardial infarction.

2. The present episode should be the first episode of myocardial infarction.
3. Patient should have fairly recovered from myocardial infarction and advised as fit for interview by the cardiologists and shifted to intermediate care unit.
4. Only patients who are willing to co-operate for interview were included in the study.

### **Exclusion Criteria**

1. Other than myocardial infarction patients experiencing signs of angina pectoris, unstable Angina etc were excluded from the study.
2. Patients with previous psychiatric, psychosomatic illnesses were excluded from the study.
3. Patients with any other chronic physical illness which is not co morbid with myocardial infarction were excluded.
4. Patients with Diabetes mellitus, who developed myocardial infarction has excluded from the study.
5. Those patients, who have previously undergone coronary by pass procedure, and now developing first episode of myocardial infarction has excluded from the study.

## **HYPOTHESIS**

The following hypothesis were formulated:

1. Patients suffering from myocardial infarction will have more of stressful life events in the previous 12 months.
2. Myocardial infarction patients who do not have any other known physical risk factors have more stressful life events.
3. Stressful life events have significant correlation with physiological changes such as hypertension.
4. Myocardial infarction patients will have significantly higher level of psychological morbidity during follow up.

## **LIMITATIONS OF THE STUDY**

The study has been a cross sectional analysis involving small sample size. The limitations have been attributable to the difficulties of the researcher with respect to the time. For the same reason the therapeutic management of psychological consequences and regular follow up could not be carried out. Though certain patterns of correlations appeared during the study, the same could not be verified due to the smallness of the sample.

## OPERATIONAL METHODS

During the ward survey patients who are admitted for myocardial infarction was seen with the consent of the cardiologist after having a brief discussion about the illness. After ascertaining the fitness of the patient, for a detailed psychiatric interview, the patient was approached and explained about the nature of the study. Confidentiality was assured. The patient was informed that there may not be any immediate therapeutic value following this interview. Only those patients who are willing to undergo the interview were included. After obtaining the consent from the patient, the interview was held either in a single setting or in multiple settings if requested by the patient. This enable the researcher to have a co-operative and reliable interview with the patient. Thirty such consecutive patients were seen and interviewed in detail. Sample was found to have male and female patients and all of them have been admitted with impending fear for serious physical morbidity and possible mortality. 30 male patients who are admitted as inpatient in Department of Diabetology and General Medicine ward were taken up as controls.

**All these patients satisfied the above inclusion criteria, and the exclusion criteria were as follows:-**

1. Patient should not have suffered form previous history of ischaemic heart disease.

2. Patient should not have had previous psychiatric, psychosomatic illnesses.
3. Patient should not have suffered from any other physical illness which is not comorbid with diabetes mellitus. Like in the sample cases these patients are also interviewed after getting consent of the physician about the fit new to stand the interview and the consent from the patient for the same.

Thirty such randomly selected patients were taken as controls. Both the patients and controls were administered the following tool:

1. Proforma specifically designed for the purpose
2. Presumptive stressful life events scale (PSLE – S)
3. Socio economic status scale (SES)
4. Hospital anxiety and depression scale.
5. ICD 10 criteria for depressive episode.

The following statistical methods were used in the study.

Parametric tests like simple mean, standard deviation, students ‘t’ test.

Karl person’s coefficient of correlation were used.

Non parametric tests using chi square was also used for qualitative variables.

## **1. Clinical Proforma:**

The subjects were assessed using a specially designed clinical proforma. The socio demographic and clinical characteristics were recorded in this. These included items such as Name, Age, Hospital No., Marital Status, Occupation, Type of diet, Domicile Type, Family Type, Income, Weight, Smoking, Cholesterol level, alcohol intake pattern, Blood pressure, Family history, Clinical information regarding symptoms and current management.

## **2. Assessment of life events**

### **Presumptive stressful life events scale (PSLES – Gurmeet Singh et al 1984)**

Presumptive stressful life events designed for use in Indian population. It was devised based on Holme's and Rahe's Social readjustment rating schedule (SRRS) because many items in social readjustment rating schedule were found to be not suitable for Indian population.

This is a 51 items scale developed by Gurmeet Sing et al in 1984 for particular application to the Indian culture. The scale was standardized on 200 normal subjects and was found to be uninfluenced by age, education and martial status. Each events is given a mean stress score which varies from 95 to 20. The events may further be divided into desirable, undesirable, and ambiguous, personal and impersonal. In our population, an average individual



experiences an average of ten common stressful events in a life time without suffering any obvious adverse physical or psychological disturbances. Similarly mean number of stressful events experienced over a period of one year without producing overt physical or mental illness is approximately two.

The 51 items could be broadly pertaining to family, social, work, financial, marital, sexual, health and bereavement aspects.

In this study the patients were assessed if they had experienced any life event from the 51 items in the last one year prior to their presentation here and each life event was rated as present or absent.

### **3. Hospital anxiety and depression Scale**

In this scale Zigmond and Snaith (1983) attempted to overcome a problem in the use of symptom rating scale in hospital populations. Many patients, especially in the general hospital practice, have physical as well as psychiatric conditions. Some of these for eg. Cardiac disease which produces palpitations could give misleadingly high scores on most of the depression and anxiety rating scales, which include ratings of somatic symptoms on the assumption that they are psychogenic. A scale without this contamination would be valuable in self assessment of psychiatric disorder in general hospitals.

Depression items were included if they made no reference to physical functions. These items referred almost exclusively to the anhedonic; those which is said to be the control feature of a depressive illness. Anxiety items were added from the present status examination. This is a little surprising as matter of the anxiety items in the present status examination rely on autonomic symptoms for the identifications.

The Hospital Anxiety Depression scale was found to be a reliable instrument for detecting states of depression and anxiety in the setting of a hospital medical inpatient/outpatient clinic (Sigmund and Snaith 1983). HRDS contains 7 items in each of the two subscales measure anxiety and depression which the patient experienced over the past one week. The anxiety and depression subscales are also valid measures of severity of the emotional disorder. Each item in the scale has 4 alternatives to choose from which is rated from, 0 to 3. A cut off of 8 to 10 for both anxiety and depression has been suggested by authors.

In the medical population the depression scale correlated 0.70 with an independent global rating, and anxiety scale correlated 0.74. Each subscale was independent in that they failed to correlate significantly with the global rating of the other mood. The scale scores were independent of physical illness. The scale was assessed for its usefulness as a case finding instrument

in a general hospital population. Preliminary data showed that as many as 20%-25% of patients would be unclassified or borderline if the Hospital Anxiety and Depression scale was used, as a screening test. Thus if it to be used, a low threshold score would have to be adopted to ensure that no cases are missed.

**4. Socio Economic Status Scale (SES) S.E.Gupta & B.P. Sethi (1978)  
(Kuppusamy 1962)**

Socio economic status consists of scores on 3 variables (viz Education, Occupation and Income) on the basis of a 10 point scale. It consists of 10 categories of socio economic status ranging from highest to the lowest. The 10 point scale consists of 200 scores with equal class intervals. The categories are being grouped into 5 social class viz., very high, high upper middle, lower middle and very low. The inter – rater reliability is found to be high ( $R=0.9$ ). This scale incorporates guidelines to score children, dependent persons as well as non dependent persons, married and unmarried subjects. The general principles applied that initial 40 scores deal remarkable lower 8 position. The next 60 scores relate to average to slightly above average positions and the scores between 100 to 200 pertains to the higher positions.

The other scales (Kuppusamy 1962, Varma Khanna 1976) which had earlier been most frequently employed in study purposes have become

irrelevant in the present socio economic context in view of substantial devaluation of currency and various other social changes. In fact the present scale (Gupta and Sethi) also needs revisions.

## **5. ICD - 10 Depressive Episode**

In typical depressive episodes, of all three varieties described below, (Mild F32.0, moderate F32.1, and severe F32.2 and F32.3) the individual usually suffers from depressed mood, loss of interest and enjoyment and reduced energy leading to increased fatigability and diminished activity. Marked tiredness after only slight effort is common.

Other symptoms are

- a) Reduced concentration and attention.
- b) Reduced self esteem and self confidence
- c) Ideas of guilt and unworthiness
- d) Bleak and pessimistic views of the future
- e) Ideas or acts of self harm or suicide
- f) Disturbed sleep
- g) Diminished appetite

To diagnose F32.0 mild depressive episode

- 1) 2 major typical symptoms + 2 minor symptoms must be present.

For F32.1 moderate depressive episode

1. 2 major typical symptoms + 3 minor symptoms must be present atleast

For F32.3 severe depressive episode without psychotic symptoms

1. 3 major typical symptoms + 4 minor symptoms

For F32.3 severe depressive episode with psychotic symptoms

1. 3 major typical symptoms + 4 minor symptoms + Delusions and Hallucinations stupor must be present

According ICD 10 criteria duration atleast 2 weeks is usually required for making the diagnosis of depression.

## RESULTS AND INTERPRETATIONS

**Table I**

**Distribution of sample and control with regard to socio demographic variables**

S. No	Variables	Sample Myocardial Infarction n=30		Control Diabetes Mellitus n=30		Statistical significant
		n	%	n	%	
1	<b>Age in years</b>					t=0.311 NS t=0.42 NS
	a. < 25	0	0	0	0	
	b. 26-55	17	56.67	16	53.33	
	c. 56 above	13	43.33	14	46.67	
	Mean		52.3		52.1	
	Median		54.5		52.5	
	Range		27.75		26.70	
2	<b>Marital Status</b>					
	Married	30	100	30	100	
	Unmarried	0	0	0	0	
3	<b>Sex</b>					Chi = 3.16 p>0.05 NS
	a. Male	27	90	30	100	
	b. Female	2	10	0	0	
4	<b>Socio Economic status</b>					Chi 4.371 p=5.99 NS
	Very low	0	0	0	0	
	Lower middle	17	56.7	11	36.7	
	Upper middle	12	40.0	19	63.3	
	High	1	3.3	0	0	
	Very High	0	0	0	0	

S. No	Variables	Sample Myocardial Infarction n=30		Control Diabetes Mellitus n=30		Statistical significant
5	<b>Literacy</b>	9		8		Chi = 1.57 p>0.05 NS
	a. Illiterate	10	30	12	26.67	
	b. Primary	5	33	7	40	
	c. High school	6	17	3	23.33	
	d. Higher education		20		10	
6	<b>Domicile</b>					Chi = 1.09 p>0.05 NS
	a. Urban	19	63	15	50	
	b. Rural	11	37	15	50	

Table I shows the distribution of myocardial infarction and diabetes mellitus patients with regard to age. The results show that 56.67% of myocardial infarction group lies between 25 to 55 years and 43.33% of myocardial infarction patients lies above 55 years. In the diabetes mellitus group the results shows that 53.33% of patients lies between 25 to 55 years and 46.67% of patients lied above 55 years. This is statistically not significant. Hence the sample and the control were matched according to age.

It is found that all patients were married. It is found that the sample of myocardial infarction groups contains 27 males and 3 female patients. The control group (Diabetes Mellitus) contacting 30 males. There is no statistical significance between the sample and control group. Hence, both the groups were matched.

The distribution of myocardial infarction and diabetes mellitus patients with regard to socio economic status, the results shows that in the myocardial infarction group 17 (56.7%) were in the lower middle socio economic status, 12 (40.0%) were in the middle class socio economic status, and while in 1 (3.3%) was in high socio economic group while diabetes mellitus 11 (36.7%) were in lower middle socio economic status, and 19 (63.3%) were in middle class socio economic status. Again there is no statistically significant.

The distribution of myocardial infarction and Diabetes mellitus patterns with regard to literacy, shows that, in myocardial infarction group, 9(30%), were illiterates, 10 (33%) were educate up to primary education, 5(17%) were studied up to high school level, and 6 (20%) had higher education. In Diabetes mellitus group 8 (26.67%) were illiterate, 12 (40%) were studied upto primary level 7 (23.33%) were upto high school levels 3 (10%) had higher education. Once again there was no statistical significant between both the groups.

The distribution of myocardial infarction and diabetes mellitus patients with regard to domicile type, shows that in myocardial infarction group 19 (63%) were of urban back ground and 11 (37%) were of rural back ground and in the diabetes mellitus 15(56%) were of urban back ground and 15 (50%) were in the rural back ground. There is no statistical significant again.



**Table II**

**Comparison of Clinical Data between Sample and Control**

<b>Clinical Data</b>	<b>Sample MI n=30</b>		<b>Control D.M.</b>		<b>Statistical significant</b>
	<b>Mean</b>	<b>S.D.</b>	<b>Mean</b>	<b>S.D.</b>	
B.P. (mmHg) systolic	131.3	23.06	115.7	18.40	t=5.39 sig
Diastolic	81.3	11.93	78.4	13.94	t=3.35 sig
Blood sugar	102.4	11.71	236.7	24.59	t=4.97 sig
Sr. Cholesterol	174	29.2	-	-	-

**Blood Pressures**

The systolic B.P. in the myocardial infarction group was  $131.3 \pm 23.06$  in the diabetes mellitus group  $115.7 \pm 18.40$ . The difference is statistically significant. The diastolic B.P. in the myocardial infarction group was  $81.3 \pm 11.93$  and in the diabetes mellitus group.  $78.4 \pm 13.94$ . The difference is again statistically significant.

### **Blood Glucose**

In the myocardial infarction group has a mean glucose level of  $102.4 \pm 11.74$  where as in diabetes mellitus  $236.7 \pm 24.59$ . The difference is again statistically significant.

### **Cholesterol**

In myocardial infarction group the mean cholesterol value is  $174 \pm 29.2$ .

**Table III****Comparison of clinical data of Alcohol and Smoking between Sample and Control**

<b>Clinical Date</b>	<b>Sample</b>		<b>Control</b>		<b>Statistical significant</b>
<b>Alcohol</b>					
a. Absent	18	60	21	70	
b. Mild (occasional)	4	13.33	6	20	Chi 3.04
c. Moderate 180ml twice or thrice week	6	20	2	6.67	p>0.05 NS
d. Heavy (daily)	2	6.67	1	3.33	
<b>Smoking</b>					
a) Absent	14	46.67	14	46.67	Chi = 0.52
b) Moderate <10 / day	10	33.33	8	26.67	p>0.05
c) Severe >10 / day	6	20	8	26.7	NS

### **Alcohol use**

In the myocardial infarction group (18) 60% were non-alcoholics 4 (13.33%), fell in the mild category, 6 (20%) in moderate and 2 (6.67%) were heavy drinkers while in the diabetes mellitus group (21) 70% non alcoholic 6 70% fell in the mild category, 2 (6.67%) in moderate and 1 (3.33%) was heavy drinker. This difference is statistically not significant.

### **Smoking**

In the myocardial infarction group 14 (46.67%) were non smokers, 10 (33.33%) were moderate smokers and 6(20%) were heavy smokers. In the diabetes mellitus group 4 (46.67%) were non smokers, 8 (26.7%) were moderate smokers, 8 26.7% were heavy smokers. The difference is not statistically significant.

**Table IV**

**Comparison of number of total presumptive stressful life events (PSLE)  
between Sample and Control**

	<b>More than 2</b>	<b>Less than or equal to 2</b>	<b>Total</b>
Sample MI n=30	17	13	30
Control DM n=30	6	24	30
Total	23	37	60

**Chi** 8.57 p <0.05 significant

Table IV shows that, in myocardial infarction group, 13 patients were having 2 or less number of presumptive stressful life events in the past 12 month, and 17 patients having more than 2 presumptive stressful life even in the past 12 moths, whereas in diabetes mellitus group, 24 patients were having 2 or less number of presumptive stressful life events in the past 12 months, and 6 patients were have, more than 2 presumptive life events in the past 12 months. This difference is statistically significant.

**Table V**

**Comparison of presumptive stressful life events score between  
sample and control**

	<b>More than 110</b>	<b>Less than or equal to 110</b>	<b>Total</b>
Sample MI n=30	21	9	30
Control DM n=30	5	25	30
Total	26	34	60

**Chi** 17.42 p <0.05 significant

Table V shows that, in myocardial infarction group, 9 patients were having 110 or less of total score of presumptive like events in the past 12 months. Whereas, 21 patients had the score of more than 110 in the preceding 12 months. In diabetes mellitus group again 25 patients had the score of 110 or less in the presumptive life events score, in the preceding 12 months, and 5 patients had score of more than 110 in the proceeding 12 months. This difference is again statistically significant.

**Table VI**

**Comparison of Depression between sample and control**

	<b>Mild</b>	<b>Moderate</b>	<b>Nil</b>	<b>Total</b>
Sample MI n = 30	13	7	10	30
Control DM n=30	3	0	27	30

**Chi** 21.03 p = 5.99 significant

Table VI shows, that, among the myocardial infraction group (sample), during the post infarction period, 13 patients were fulfilling the criteria for mild depression, and 7 patients, fulfills the criteria for moderate depression, whereas 10 patients did into show any evidence of depression. In the control (Diabetes mellitus) group. 3 patients fulfill the criteria for mild depression, and none of the patients had moderate depression, and 27 patients did not have depression. The difference is statistically significant.

**Table VII**

**Comparison of Anxiety between sample and control**

	<b>Anxiety</b>		<b>Total</b>
	<b>Present</b>	<b>Absent</b>	
Sample MI n=30	10	20	30
Control DM n=30	5	25	30

Chi = 2.22 p=3.84 Not significant

Table VII shows, that among myocardial Infarction group, (Sample) during the post infarction period. 10 patients had anxiety, whereas 20 patients did not have any signs of anxiety. In diabetes mellitus (control) group, 5 patients showed evidence of anxiety, and rest of 25 patients did not have any signs of anxiety. The difference between two groups were statistically not significant.



**Table VIII**

**Comparison of presumptive stressful life events score between sample and control**

	<b>Total PSLE Score</b>	<b>Mean</b>	<b>SD</b>	<b>Statistical Significant</b>
Sample MI n=30	4158	139	52.86	t=11.78
Control DM n=30	2587	86	37.02	significant

Table VIII showed that the difference between the total presumptive stressful life events scores between the myocardial infraction group and diabetes mellitus group was statistically significant.

**Table IX**

**Comparison of Anxiety and Depression score sample and Control**

<b>Variable</b>	<b>Sample MI n=30</b>		<b>Control DM n=30</b>		<b>Statistical Significant</b>
	<b>Mean</b>	<b>SD</b>	<b>Mean</b>	<b>SD</b>	
Anxiety	5.13	4.23	3	3.86	t=2.03 sig
Depression	8.63	4.91	2.4	2.96	t=5.93 sig

Table IX showed that, the difference between the means of total anxiety score between the myocardial infarction group and diabetes mellitus group, as well as the means of total depression score between the myocardial infarction group and diabetes mellitus group were statistically significant.

**Table X**

**Comparison of Risk and Non risk Group among sample**

<b>Sample MI n = 30</b>	<b>Number</b>	<b>Total PSLE Score</b>	<b>Mean</b>	<b>SD</b>	<b>Statistical Significant</b>
Risk	12	2104	175.3	29.28	t=15.39
Non-Risk	18	2054	114.1	54.57	significant

Table X shows that, mean of total presumptive life event score is more in myocardial infarction patients who are having physical risk factors such as hypertension, when compared to the myocardial infarction patients, who do not having any physical risk factor. The difference between the two means is statistically significant.

**Table XI**

**Age wise Comparison of Anxiety in sample**

<b>Age in year</b>	<b>Present</b>	<b>Absent</b>	<b>Total</b>
25-50	6	8	14
51-75	4	12	16
Total	10	20	30

Chi 2.208 p=3.84 Not significant

**Table XII**

**Age wise distribution of Depression in Sample**

<b>Age in year</b>	<b>Depression</b>			<b>Total</b>
	<b>Mild</b>	<b>Moderate</b>	<b>Nil</b>	
25-50	6	2	6	14
51-75	7	5	4	16
Total	13	7	10	30

Chi 1.638 p=5.99 Not significant

**Table XIII**

**Urban – Rural Distribution of Anxiety of Sample**

<b>Age in Years</b>	<b>Urban</b>			<b>Rural</b>			<b>Grand Total</b>
	<b>Present</b>	<b>Absent</b>	<b>Total</b>	<b>Present</b>	<b>Absent</b>	<b>Total</b>	
25-50	4	4	8	2	4	6	14
51-75	2	9	11	2	3	5	16
Total	6	13	19	4	7	11	30

p=3.84 Chi 0.071

Not significant.

**Table XIV**

**Urban Rural Distribution of depression in Sample**

<b>Age in Years</b>	<b>Urban</b>				<b>Rural</b>				<b>Grand Total</b>
	<b>Mild</b>	<b>Moderate</b>	<b>Nil</b>	<b>Total</b>	<b>Mild</b>	<b>Moderate</b>	<b>Nil</b>	<b>Total</b>	
25-50	4	0	4	8	2	2	2	6	14
51-75	5	4	2	11	2	1	1	5	16
Total	9	4	6	19	4	3	4	11	30

p = 5.99 Chi 0.359 Not significant

**Table XV**

**Literacy and morbidity**

<b>Literacy</b>	<b>Depression</b>				<b>Anxiety</b>		
	<b>Mild</b>	<b>Moderate</b>	<b>Nil</b>	<b>Total</b>	<b>Present</b>	<b>Absent</b>	<b>Total</b>
Illiterates	2	6	1	9	1	8	9
Primary	6	1	3	10	3	7	10
High school	4	0	1	5	1	4	5
Higher Education	1	0	5	6	5	1	6
Total	132	7	10	30	10	20	30

Total XI, XII, XIII, XIV does not show, any significant difference, when the anxiety, and depression in the myocardial infraction group was compared on the basis of urban rural distribution.

**Table XVI**

**Comparison between number of life events and Hypertension in sample**

<b>Life events</b>	<b>Hypertension</b>		<b>Total</b>
	<b>Percentage</b>	<b>No</b>	
$\leq 2$	0	13	13
$>2$	11	6	17
Total	11	19	30

Chi 13.23  $p < 0.05$  significant

Table XVI shows, that the total number of life events in the preceding 12 months, of those myocardial infarction patients, who are having hypertension, is statistically significant when compared to those myocardial infarction patients who are not having hypertension.

**Table VII**

**Comparison between presumptive life event score and hypertension in sample**

<b>Life events</b>	<b>Hypertension</b>		<b>Total</b>
	<b>Percentage</b>	<b>No</b>	
≤110	8	8	16
>110	1	13	14
Total	9	21	30

Chi 6.52 p<0.05 significant

Table XVII shows that, the total presumptive life events score in the preceding 12 months of those myocardial infarction patients who are having hypertension is statistically significant, when compared to those myocardial infarction patients, who are not having hypertension.



**Table XVIII**

**Inter correlation matrix for selected factors in myocardial  
infarction group**

	<b>Age</b>	<b>Bp(s)</b>	<b>Bp(D)</b>	<b>Glu</b>	<b>L.E.</b>	<b>Anxi</b>	<b>Dep</b>
Age	1.000						
Bp(s)	-0.244	1.000					
Bp(D)	-0.042	+0.579	1.000				
Glu	-0.068	-0.011	+0.059	1.000			
L.E	-0.282	+0.134	+0.074	+0.185	1.000		
Anxi	-0.318	+0.156	+0.281	+0.215	+0.327	1.000	
Dep	+0.253	-0.244	-0.057	-0.392	-0.338	-0.771	1.000

Anx - Anxiety

Dep - Depression

Bp(S) - Blood Pressure Systolic

Glu - Blood Glucose

Bp(D) - Blood Pressure Diastolic

L.E. - Life Events

+ Positively Correlated – Negative Correlated

Inter correlation matrix shows that in myocardial infarction group, the life events positively correlate with anxiety, systolic blood pressure positively correlates with diastolic blood pressure, life events and anxiety, whereas diastolic blood pressure positively correlated with blood glucose, life events and anxiety, the blood glucose positively correlates with life events and anxiety.

**Table XIX**

**Inter correlation matrix for selector factors of diabetes mellitus group**

	<b>Age</b>	<b>Bp(s)</b>	<b>Bp(D)</b>	<b>Glu</b>	<b>L.E.</b>	<b>Anxi</b>	<b>Dep</b>
Age	1.000						
Bp(s)	-0.140	1.000					
Bp(D)	-0.119	+0.848	1.000				
Glu	-0.082	+0.136	+0.139	1.000			
L.E	-0.316	+0.110	+0.020	-0.056	1.000		
Anxi	-0.325	+0.047	-0.041	-0.007	-0.047	1.000	
Dep	-0.363	-0.078	-0.187	-0.139	+0.439	-0.049	1000

Anx - Anxiety

Dep - Depression

Bp(S) - Blood Pressure Systolic

Glu - Blood Glucose

Bp(D) - Blood Pressure Diastolic

L.E. - Life Events

+ Positively Correlated – Negative Correlated

Inter correlation matrix shows that in diabetes mellitus group, the life events positively correlate with depression, systolic blood pressure positively correlates with diastolic blood pressure, blood sugar, life events and anxiety where as diastolic blood pressure positively correlate with blood glucose and life events.

## DISCUSSION

The findings in the study bring to light certain observations which, inspite of the limitations in the study, may be generalizable. The sample essentially consists of males and female in their middle ages or above, belonging to lower upper middle socio economic status predominately, usually in the urban and rural domicile. The higher incidence of myocardial infarction in the males and with the increasing age, have been known biological variables and have been substantiated in many studies (WHO1992, Bhatia et al 1990).

The hospital setting being free, caters to relatively low socio economic population and the findings among the controls corroborates with the similar representation. Patients with myocardial infarction belong predominantly to the middle socio economic status. To interrupt the finding as reflecting that myocardial infarction occurs in economically affluent population, might have an element of fallacy. Patients with myocardial infarction might rush to the nearby hospital with all facilities available. The lack of significant number of patients belonging to the higher income group might reflect that those who could afforded probably gravitated to private hospitals. This may equally the reason for the urban predominance in the infarction patients. The findings

comparable to data of studies elsewhere in the west which describes myocardial infarction as an urban phenomenon (Who 1992, Jatoo et al 1988).

Comparison of the clinical variables shows that infarction patients generally had a higher level of blood pressure. It might indicate their proneness (WHO 1978). All biochemical parameters could not be compared and findings are not significantly contributed.

Alcohol consumption was comparatively low among the myocardial infarction patients, because the alcohol population from a rural low socio economic background had a overwhelming presence of alcoholism. Similar could be the explanation for lesser incidence of smoking among the myocardial infarction patients.

Stressful life events of two groups are compared. Both the illness have been described as psychosomatic illnesses and the life stress was significantly mote in myocardial infarction than the controls. The results compare with studies by Rahe et al, (1971) Theorell et al, (1993), Mahendru et al (1976) Connolley et al (1976) (1990), Rajeev et al (1993).

Connely et al (1976) reported significantly more life events among cases of infarction over a three week period before the onset.

In 1993, another case – control study showed significantly increased risk associated with emotionally upsetting events within 24 hours of onset [adjusted O.R = 2.7 (1.1 to 6.6)] and emotional stress at work within four weeks of onset [adjusted OR = 1.4 (1.1 to 2.1)].

So far the only published case cross over study of the relation between life events and myocardial infarcts had been performed by Mittle man et al.

Rajee et al (1993) in their study have offered a biological explanation that stress raises catecholamines and cortisol levels which are important in the genesis of myocardial ischemia. R.P. Steeds et al (2004) in their case control and case cross over study found that, stressful life events experienced especially, high demands, competition, or conflicts are potential trigger of onset of myocardial infarction.

The researcher in his study has observed the significant life stresses are more in study patients. The common life stressors are going to pleasure trip (50.00%), change in sleeping habit (46.6%) Death of the close family member (43.33%), Financial loss (36.66%), Large loan (33.33%), self / family member unemployed (30.00%), Illness of family members (26.66%), change in residence (25.66%), marriage of daughter / dependant sister (23.33%), conflict with the in-law (20.00%).

Mahendru et al (1976) in their study had concluded that large number of patients (61.8%) demonstrated emotional stress of significant intensity prior to the onset of myocardial infarction, while 38.2% did not experience such a stress. The most frequent areas of disturbance observed was maladjustment in the family (36.9%), severe financial stress (21.00%), Job difficulties (19.7%), heavy loss in business (19.7%), heavy debts (15.7%) marital disharmony (9.2%), death of wife (9.2%) maladjustment with other persons (9.2%), law suits and court appearances (7.9%), death of children. (7.9%)

The death of the close family members, illness in the family members, were the major contributors in the present study, whereas in the other one maladjustment within the family members was the major contributor. Financial problems have been significantly present in both study groups. The difference in the perceived stresses could be well due to the socio cultural differences and Perception of the different ethnic groups.

In the researchers study the significant life stressors is more in the family and social sphere, health sphere and also in the work area. In the present study 12 patients exhibited significant risk factors and the rest showed higher level of mean stressful scores. The perusal of the record shows from that whenever infarction occurred without any risk factors, the stress score was high. The difference was statically significant.

Similarly in the correlation matrix stress was found to be positively correlating with blood pressure in the group, and the control group. This might indicate that there could be a significant association between the perceived stress and cardiovascular response, in the infarction patients, and diabetes mellitus patients.

A study by Ahto et al, using the self rating depression scale, to find out the prevalence of depression and the occurrence of depressive symptoms among coronary heart disease, showed that the prevalence of depression was 29% among male patients, and 20% among female patients. He also concluded that the association of coronary heart disease with depression among men is explained by the chronic physic stress.

## CONCLUSION

This cross sectional study has the objective to analyse the association of psychosocial stressors, and the occurrence of myocardial infarction, psychological consequences which accompanying the infarction.

From the study, it has concluded that, those patients who developed myocardial infarction, have more of stressful life events in the preceding 12 months. Among the stressful life events, the death of close relative or friend, financial loss, the marriage of a dependent sister or daughter have occurred in a significant number of patients. Those patients, who are found to be hypertensive, had significant life events, than who are non-hypertensive.

It has also concluded that the psychological consequences (especially depression), following myocardial infarction is significantly higher level, in the immediate post infarction period.

Finally it has concluded that, by educating the patient with group psychotherapy or behaviour therapy to combat the psychosocial changes contributing the diseases, and effective sociocultural measures and the early therapeutic intervention can reduce the preventive psychological morbidity.



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# APPENDIX - I

## PROFORMA – SOCIODEMOGRAPHIC DATA

Name	Sex
Age	Hosp No
Marital status	Education
Vegetarian / non vegetarian	Occupation
Domicile type	Income
Family type	Weight
Cigarettes/day	B.P.
Serum cholesterol	Alcohol intake pattern
Family history of I.H.D.	Blood Sugar
Currently on	
Clinical information regarding symptoms	

## **APPENDIX – II**

### **PRESUMPTIVE STRESSFUL LIFE-EVENTS SCALE**

**(Singh et al, 1981)**

1. Death of spouse (95)
2. Extra marital relation of spouse (80)
3. Marital separation / divorce (77)
4. Suspension or dismissed from job (76)
5. Detention in jail of self or close family member (72)
6. Lack of child (67)
7. Death of close family member (66)
8. Marital conflict (64)
9. Death of friend (61)
10. Robbery or theft (59)
11. Excessive alcohol or drug use by family member (58)
12. Conflict with in-laws (57)
13. Broken engagement or love affair (57)
14. Major personal illness or injury (56)
15. Son or daughter leaving home (55)
16. Financial loss or problems (54)
17. Illness of family members (52)
18. Trouble at work with colleagues, superiors or subordinates (52)
19. Prophecy of astrologer or palmist etc. (52)
20. Pregnancy of wife (wanted or unwanted) (52)
21. Conflict over dowry (self or spouse) (51)
22. sexual problems (51)
23. Self or family member unemployed (51)
24. Lack of son (51)
25. Large of loan (49)
26. Marriage of daughter or dependent sister (48)
27. Minor violation of law (48)
28. Family conflict (47)
29. Break up with friend (47)
30. Major purchase or construction of house (46)
31. Death of pet (44)
32. Failure in examination (43)
33. Appearing for examination or interview (43)
34. Getting married or engaged (43)
35. Trouble with neighbour (40)

36. Unfulfilled commitments (40)
37. Change in residence (40)
38. Change or expansion of business (37)
39. Outstanding personal achievement (37)
40. Begin or end schooling (36)
41. Retirement (35)
42. Change in working condition or transfer (33)
43. Change in sleeping habits (33)
44. Birth of daughter (30)
45. Gain of new family member (30)
46. Reduction in number if family functions (29)
47. Change in social activities (28)
48. Change in eating habits (27)
49. Wife begins or stops work (25)
50. Going on pleasure trip or pilgrimage (20)

Total Score :

Total No. of events :

## APPENDIX - III

### HOSPITAL ANXIETY AND DEPRESSION SCALE

1. I feel tense or wound up
  - a. Most of the time 3
  - b. A lot of the time 2
  - c. From time to time, occasionally 1
  - d. Not at all 0
2. I still enjoy the things I used to enjoy
  - a. Definitely as much 0
  - b. Not quite so much 1
  - c. Only a little 2
  - d. Hardly at all 3
3. I get a sort of frightened felling as if something awful is about to happen
  - a. Very definitely and quite badly 3
  - b. Yes, but not too badly 2
  - c. A little, but it does not worry me 1
  - d. Not at all 0
4. I can laugh and see the funny side of things
  - a. As much as I always could 0
  - b. Not quite so much now 1
  - c. Definitely not so much now 2
  - d. Not at all 3

5. Worrying thoughts go through my mind
- a. A great deal of the time 3
  - b. A lot of time 2
  - c. From time to time but not too often 1
  - d. Only occasionally 0
6. I feel cheerful
- a. Not all 3
  - b. Not often 2
  - c. Sometimes 1
  - d. Most of the time 0
7. I can sit at ease and feel relaxed
- a. Definitely 0
  - b. Usually 1
  - c. Not often 2
  - d. Not at all 3
8. I feel as if I am slowed down
- a. Nearly all the time 3
  - b. Very often 2
  - c. Sometimes 1
  - d. At all 0
9. I get a sort of frightened feeling like butterflies in the stomach
- a. Not at all 0
  - b. Occasionally 1
  - c. Quite often 2
  - d. Very often 3

10. I have lot interest in my appearance
- a. Definitely 3
  - b. I don't take so much care as I should 2
  - c. I may not take quite as much care 1
  - d. I take just as much care as ever 0
11. I feel restless as if I have to be on the move
- a. Very much indeed 3
  - b. Quite a lot 2
  - c. Not very much 1
  - d. Not at all 0
12. I took forward with enjoyment to things
- a. As much as ever I did 0
  - b. Rather less than I used to 1
  - c. Definitely less than I used to 2
  - d. Hardly at all 3
13. I get sudden feelings of panic
- a. Very often indeed 3
  - b. Quite often 2
  - c. Not very often 1
  - d. Not at all 0
14. I can enjoy a good book or radio or T.V. programme
- a. Often 0
  - b. Sometimes 1
  - c. Not often 2
  - d. Very seldom 3

## APPENDIX - IV

### SOCIOECONOMIC STATUS SCALE

#### SCORING MANUAL

<b>C</b>	<b>Educational categories</b>	<b>Score</b>
1	Up to Vth class	20
2	Less than High school	40
3	High school	60
4	Intermediate	80
5	Graduation (excluding professional subjects*) or technical diploma	100
6	Post graduation	120
7	Post graduate diploma in non-professional subjects, B.E., B.Tech., B.Arch., MBBS, BMBS, BIMS, MDH, BDS, LLB	140
8	Post graduate diploma or degree in professional subjects Ph.D.	160
9	D.Litt, D.Sc or Equivalent, award of membership or fellowship from professional institutions of internal recognition	180
10	National or international award for the academic or scientific or scientific achievements	200

\* Engineering, Medicine and Law

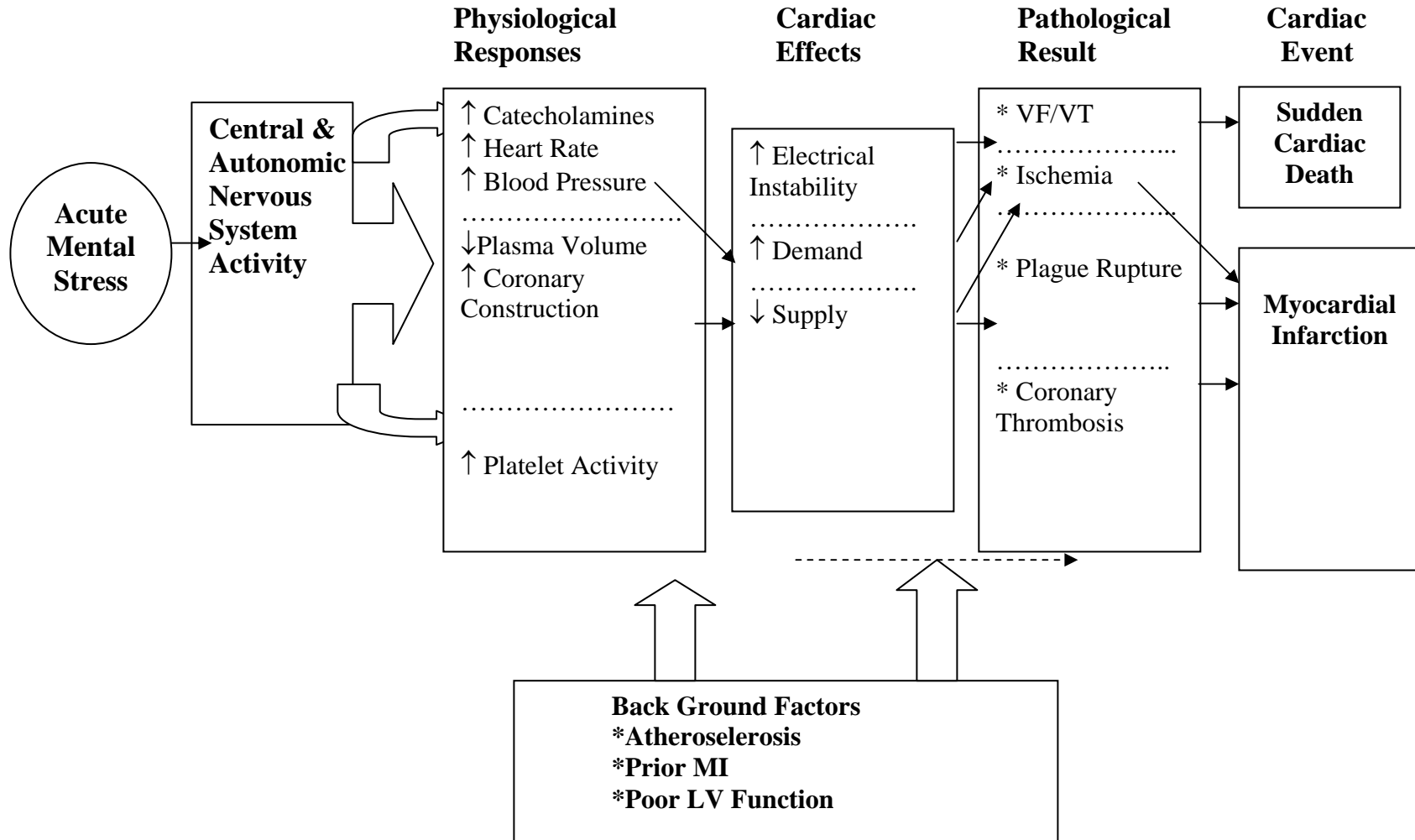
<b>Sl. No.</b>	<b>Income (Rs)</b>	<b>Score</b>
1	Upto 250	20
2	251-500	40
3	501-750	60
4	751-1000	80
5	1001-1500	100
6	1501-2500	120
7	2501-5000	140
8	5001-10000	160
9	10,000-15,000	180
10	Above 15,000	200



<b>Sl. No.</b>	<b>Educational Categories</b>	<b>Score</b>
	<b>1. Skilled and Semi-skilled</b>	
1.1	Semi-skilled or unskilled workers (e.g., barber, shoemaker, gardener and others of low skilled or unskilled labour)	40
1.2	Skilled workers (driver, painters, mechanics, printers, watch repairers, typist plumbers and equivalent)	60
	<b>2. Office work and equivalent</b>	80
2.1	Peon, Chowkidar, Constable or equivalent	
2.2	Junior grade office assistant, dispatcher, head constable or equivalent	
2.3	Senior grade office assistant, sub inspector, or lower grade inspectors (e.g., sanitary inspector, supervisors in private or public organization)	
	<b>3. Teaching Jobs</b>	
3.1	Teachers of primary and junior high school	
3.2	Teachers of High school or intermediate (excluding Principal of Intermediate College)	
3.3	Lecturers and readers in the University or equivalent, Principal of intermediate college	
3.4	University professors and principals of degree or post graduate college	
3.5	Eminent professors having national or international recognition	
	<b>4. Business</b>	
4.1	Petty business and small shop-keepers	60
4.2	Middle class businessman	80
4.3	Businessman or industrialist of upper strata	100
4.4	Eminent businessman in the town or city	120
4.5	Eminent industrialist in the state or country	160
	<b>5. Professional Jobs (medicine, law and Engineering)</b>	
5.1	Individuals in the profession of medicine, law or technology having no recognized training	60
5.2	Qualified professional having no specialization	80
5.3	Specialist in the professional jobs	100
5.4	Senior Grade specialist	120
5.5	Eminent professionalists in the field	160

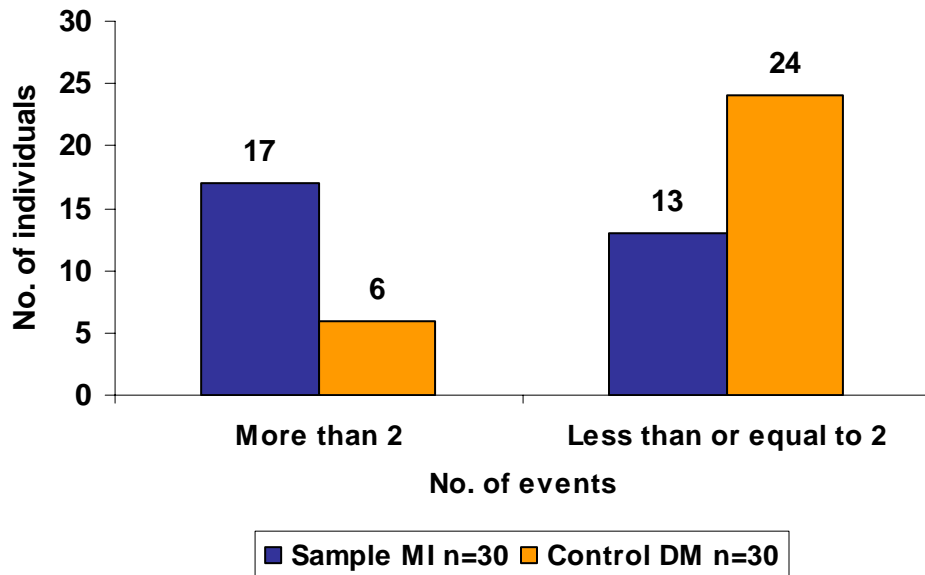
<b>6. Semi-professional</b>		
6.1	Individuals in the profession of medicine, Law or technology having no recognized training	60
6.2	Senior grade technical or scientific assistants and the semi professional (pharmacists and nursing staff)	80
6.3	Scientist employed as Class I and Class II in the central Govt. or equivalent employees in either organizations, assistant or joint director or vice principal in the technical institutions	100
6.4	Directors and Principals in technical institutions	120
6.5	Directors and highly prestigious technical institutions and / or scientist of international recognition	160
<b>7. Artist and Literary men</b>		
7.1	Low grade artists, actors, writers, religious pandits, palmists and similar others having little expertise	60
7.2	Individuals of above category having considerable expertise	80
7.3	Experts of above categories having high social image	100
7.4	Most eminent writers, poets, magicians, religions figures, artists and actors	120
<b>8. Agriculture</b>		
8.1	Small size holding of agriculture or orchard which can hardly meet the basic needs of a family	60
8.2	Medium size holding or agriculture or orchard sufficient for average middle class family in an urban setup	100
8.3	Large size holding of the above mature which can comfortable meet the requirements of an upper middle class family	120
8.4	Agriculturist or fruit grower of very large size holding	120
<b>9. Administrative service</b>		
9.1	Office Superintendent / Section officers, Inspectors (e.g., Police, Sales Tax, Income Tax etc) Junior PCs, Officers including Taliseeldar and equivalent	100
9.2	IAS and equivalent services (e.g., IPS, IFS, ISS or Senior PSC)	120

**FIGURE – I**





### Comparison of number of total presumptive stressful life events (PSLE) between Sample and Control



### Comparison of presumptive stressful life events score between sample and control

